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KNITTING MACHINE

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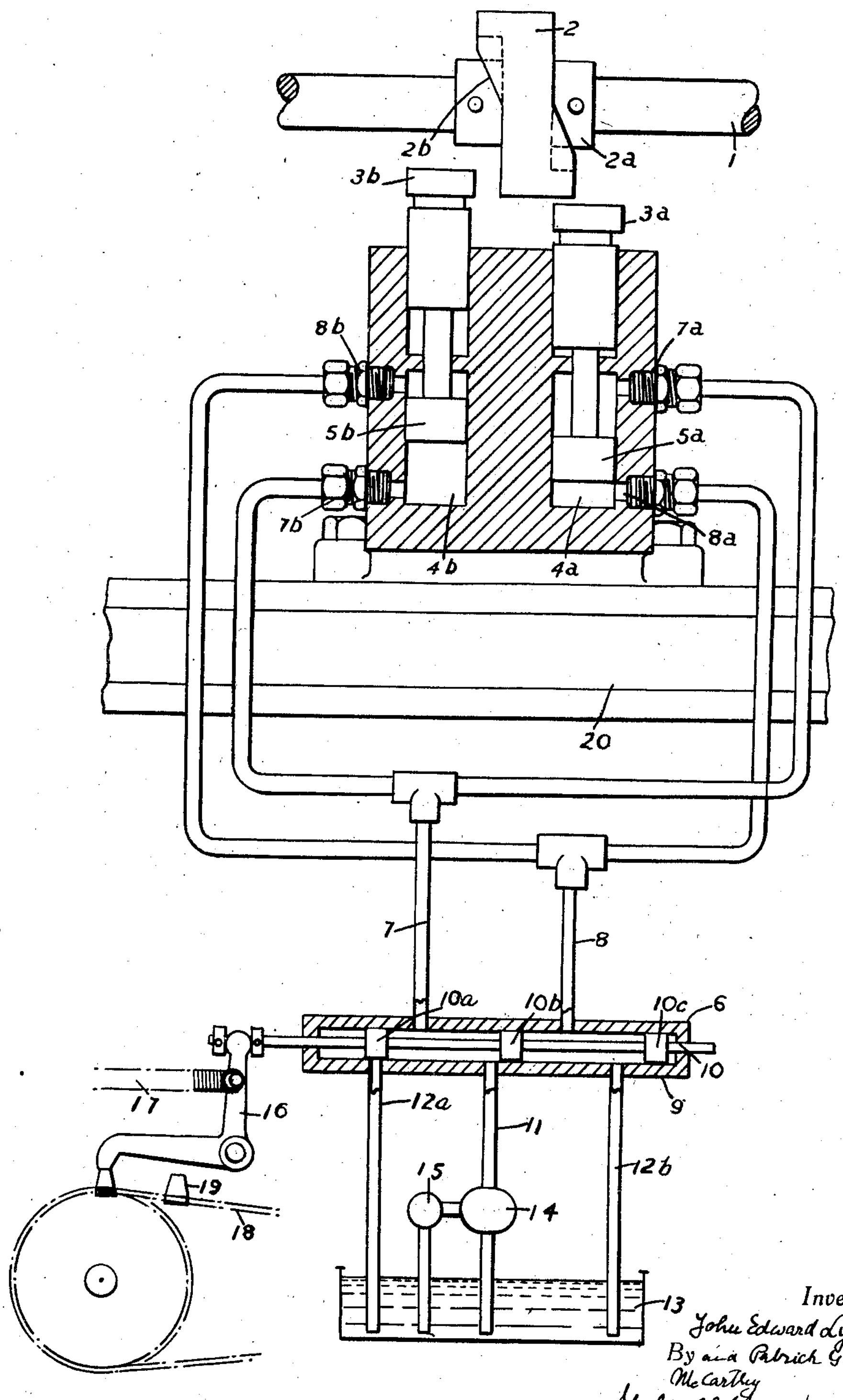

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KNITTING MACHINE

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6 Claim. (Cl. 66—82)

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This invention concerns knitting machines, primarily Cotton's patent and other straight bar knitting machines, having a rotatable member that requires to be moved axially, in one direction or the other, at intervals, and is especially concerned with machines having a shogging cam shaft.

As viewed from one aspect, the invention provides in a knitting machine having a rotatable member requiring to be shogged axially in either direction, a patterning element, and fluid-pressure means for producing the shogging movements in response to the dictates of the said element. The invention also includes in a knitting machine, especially a Cotton's patent or other straight bar knitting machine having a shogging cam shaft, the combination of a patterning element for determining the shogging motions and hydraulic or other fluid-pressure means for producing them. Specifically, there may be a thrust device movable selectively between two alternative attitudes to co-operate with the rotary member and, according to said attitude, to effect displacement of said member in one direction or the other, and fluid-pressure means for moving said thrust device between its two attitudes in response to the dictates of the patterning element. The thrust device may consist of two elements movable selectively into an operative position.

As viewed from another aspect the invention provides in a knitting machine, the combination of a rotary member having two oppositely directed end-thrust cams, abutment means movable selectively into the track of either cam and for thereby producing endwise displacement of the rotary member when the selected cam rotates into contact with the abutment means, fluid-pressure operated means for producing the selective movement of the abutment means, and a patterning device for controlling the fluid-pressure operated means.

The foregoing and other features of the invention set out in the appended claims are incorporated in the construction which will now be described as an example of its application to the shogging of the main cam shaft of a Cotton's patent or other straight bar knitting machine with reference to the accompanying drawing which discloses the cam shaft and the apparatus for shogging it.

Fixed on the cam shaft 1 there is collar 2 having a cam or incline 2a on one end face and an oppositely directed cam or incline 2b on the other end face, and associated with each incline

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there is a relatively-stationary abutment (3a, 3b) either of which is movable (as determined by a patterning device) into the track of its cam so that when the latter rotates into contact with the abutment it thrusts against the abutment and causes the cam shaft 1 to shog or more endwise, the direction of shogging being according to which incline is operative (i. e. according to which of the two abutments is operative). These abutments constitute a thrust device movable selectively between two alternate attitudes.

For each abutment 3a or 3b, there is a power cylinder 4a or 4b, and a piston 5a or 5b working therein and coupled to the abutment to move it into and out of operative position according to the direction of movement of the piston, and change-over valve mechanism 6 is provided for simultaneously connecting either selected side of a piston to fluid pressure and the other side to exhaust. Preferably, the arrangement is such that like sides of the two pistons 5a, 5b are connected one to pressure and the other to exhaust so that either abutment is moved to the inoperative position when the other is moved to the operative position.

Assuming, for simplicity in description, that the cylinders 4a, 4b are vertical and the pistons 5a, 5b rise to move the abutments 3a, 3b to operative position, there are two conduits, 7, 8 leading from a valve cylinder 9 one (7) of which is branched to communicate at 7a with the top of one power cylinder 4a and at 7b with the bottom of the other cylinder 4b and the other (8) of which conduits is likewise branched to communicate at 8a with the bottom of the first cylinder and at 8b with the top of the other cylinder 4b. In the valve cylinder 9 there is a piston valve 10 movable to open either conduit 7, or 8 selectively to pressure supply and the other to exhaust. For this purpose there may be a central inlet 11 to the valve cylinder 9 and an exhaust outlet 12a or 12b at each side of it and the valve piston 10 may have two waisted portions defining three spaced lands 10a, 10b, 10c and may be movable to cause the central land 10b to pass from one side to the other of the inlet 11 and in either position to cause that exhaust outlet 12a or 12b which is at the opposite side of the open inlet 11 from the central land 10b to be closed by the adjacent end land 10a or 10c, the other exhaust outlet being open.

The exhaust outlets 12a, 12b communicate with a sump 13 and the inlet 11 is supplied from the

latter with hydraulic fluid under pressure by a pump 14 having a relief valve 15.

The piston valve 10 is connected to a bell-crank lever or other feeler 16 which is biassed by a spring 17 into engagement with a cyclic patterning device 18 which is racked through its cycle (in known manner requiring no description or illustration) to present a row of studs or other projections 19 set out thereon in the order required, so that the presence or absence of a stud causes the piston valve 10 to be moved to one or other of its two alternative positions to advance a selected one of the abutments 3*a*, 3*b* whereby the cam shaft 1 shogs in the required direction. It will be understood that the selected abutment is moved into the track of its associated incline 2*a* or 2*b* during a phase in the rotation of the cam shaft 1 whereat its incline is rotationally spaced from the abutment and that the phase in the shaft rotation (and in the knitting sequence) at which shogging takes place is determined by the angular location of the incline and not by the movement at which the abutment moves into position.

The patterning device 18 may be a chain, drum stud disc, or the like 20 indicates a frame member of the knitting machine.

We claim:

1. In a knitting machine, the combination of a rotary member having two oppositely directed end-thrust cams, abutment means movable selectively into the track of either cam and for thereby producing endwise displacement of the rotary member when the selected cam rotates into contact with the abutment means, fluid-pressure operated means for producing the selective movement of the abutment means, and a patterning device for controlling the fluid-pressure operated means.

2. In a machine according to claim 1, fluid-pressure operated means comprising a piston-and-cylinder device for moving the abutment means, and valve mechanism controlled by the patterning device for controlling the application of fluid pressure to the piston-and-cylinder device.

3. In a knitting machine having a rotary member requiring to be shogged axially in either direction and having two oppositely-directed end-thrust cams thereon for producing the shogging motion upon rotational contact with either of two selectively-moved abutments; the combination of two fluid-pressure cylinders, a piston in each of them, an abutment connected to each piston for movement thereby into and out of operative position, change-over valve mechanism for controlling the application of fluid-pressure

to the two cylinders and for thereby producing the simultaneous movement of the two pistons in opposite directions bringing either abutment selectively into operative position and the other abutment out of it, and a patterning device controlling the operation of the valve mechanism.

4. In a knitting machine having a rotatable member requiring to be shogged axially in either direction, the combination of a patterning element, a thrust device movable slidably between two alternative attitudes to cooperate with the rotary member and, according to the attitude, to effect displacement of said member in one direction or the other, and fluid pressure means for moving said thrust device between its two attitudes in response to the dictates of the patterning element.

5. In a knitting machine having a rotatable member requiring to be shogged axially in either direction, the combination of a patterning element, and fluid pressure means for producing the shogging movements in response to the dictates of said element, which means includes a source of pressure fluid and a fluid-control valve operable by the patterning element to determine the direction of shogging.

6. In a straight bar knitting machine having a rotary cam shaft capable of shogging axially in either direction by the operation of cam faces thereon on an abutment, the combination of abutment means movable selectively into the track of either cam face and for thereby causing the cam shaft to shog when the selected face rotates into contact with the abutment means, a source of fluid pressure, piston-and-cylinder means for selectively moving the abutment means into and out of operative position, valve mechanism controlling the application of the fluid pressure to said piston-and-cylinder means, and a patterning element controlling the valve mechanism.

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